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Numerical Model, Algorithms and Software for Quantitative Estimation of Implosion Impulse-Amplitude Action on Porous-Fractured Medium in Well Bottom Zone

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Abstract

© 2018 IEEE. Mathematical, numerical and algorithmical models for computation of interconnected hydrodynamic processes in the producing well, oscillation of the implosion chamber on the elastic steel cable and filtration in the fractured-porous oil reservoir caused by hydraulic shock on bottom-hole formation zone is proposed. The iterative procedures and parallel algorithms to solve the system of non-linear algebraic equations are developed. These models are implemented in program package. The features of processes in the united implosion system 'oil reservoir - well-chamber' are numerically studied. An influence of the various parameters on the length of created fractures in the bottom-hole zone is estimated. It is shown that chamber can shift for a few meters due to elongation of the cable. The displacement magnitude depends on material of the cable and the form of the chamber that determinate its viscous interaction with borehole fluid. The important result is also that there exists the optimal size of the chamber that provides the maximal effect from the implosion hydraulic shock.

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